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EXAMINER	
FORMAN, BETTY J	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/558,532	Applicant(s) SCHANTZ ET AL.	
	Examiner BJ Forman	Art Unit 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34 and 36-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34 and 36-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

FINAL ACTION

1. This action is in response to papers filed 1 March 2002 in Paper No. 7 in which claims 1, 7, 10, 11, 15, 16, 30, 31-33 and 44 were amended and claim 35 was canceled. It is noted that the Remarks of Paper No. 7, page 11, state that Claims 1-44 are pending. It is believed that this is a typographical error, because on page 5 of the Response, Claim 35 is canceled. All of the amendments have been thoroughly reviewed and entered. The previous rejections in the Office Action of Paper No. 6 dated 1 October 2001 under 35 U.S.C. 112, second paragraph are withdrawn in view of the amendments. The previous rejections under 35 U.S.C. 103 are maintained. All of the arguments have been thoroughly reviewed and are discussed below.

Claims 1-34 and 36-44 are under prosecution.

Claim Objections

2. Applicant is advised that should claim 12 be found allowable, claim 33 will be objected to under 37 CFR 1.75 as being a duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, 7-14, 17-20, 28, 29, 31-37 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz et al. (U.S. Patent No. 6,086,190, filed 7 October 1997) in view of Brennan (U.S. Patent No. 5,474,796, filed 27 may 1993).

Regarding Claim 1, Schantz et al. teach a method of fabricating at least one addressable array on a substrate using a drop deposition apparatus having a drop dispenser unit and a sensing element, the method comprising: dispensing droplets from a drop dispenser unit onto the sensing element on the substrate; detecting electrical signals from the dispensed droplets striking the sensor element; and evaluating a performance characteristic of the deposition based on the detected signals (Column 2, line 59-Column 3, line 21 and Column 4, lines 4-12). Schantz et al. do not teach the droplets carry biopolymers. However, addressable arrays of biopolymers were well known in the art at the time the claimed invention was made as taught by Brennan. Specifically, Brennan teach a similar method of fabricating an array comprising: for each of multiple addresses, dispensing droplets carrying biopolymers from a drop dispenser unit onto a substrate so as to fabricate the array; and detecting signals resulting from the deposit of the biopolymers (Column 2, line 50-Column 3, line 36). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer carrying droplets taught by Brennan to thereby provide an addressable array of biopolymers for the expected benefit conducting a large number of biopolymer reactions each at a specific address on a support as taught by Brennan (Column 2, lines 11-15).

Regarding Claim 2, Schantz et al. teach the method wherein the electrical signals result form droplets imparting an electrical stimulus to the sensing element (Column 3, lines 22-30).

Regarding Claim 3, Schantz et al. teach the method wherein a performance characteristic of the deposition unit is evaluated (Column 4, lines 4-12).

Regarding Claim 4, Schantz et al. teach the method further comprising: when after dispensing droplets onto the substrate an error is detecting in which an evaluated performance characteristic is outside a predetermined tolerance, then the source of the error is corrected or the apparatus is operated to compensate for the error (Column 6, line 38-Column 7, line 17).

Regarding Claim 5, Schantz et al. teach the method the error is detected after dispensing droplets and the source of the error is corrected or the apparatus is operated to compensate for the error (Column 6, line 38-Column 7, line 17).

Regarding Claim 7, Schantz et al. teach detection and evaluation of the dispensed droplets (Column 6, line 38-Column 7, line 17) but they do not teach changing a set of reagents in the dispenser unit to a different set of reagents. However, Brennan teaches the similar method wherein different reagent droplets are dispensed (Fig.6). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the different reagent droplets of Brennan to the detection and evaluation taught by Schantz et al. to thereby detect and evaluate the deposition of all biopolymers dispensed onto the array for the expected benefit of economy and accuracy i.e. inexpensively dispensing each of the clinically important biopolymers with controlled accuracy and volume as taught by Schantz et al. (Abstract).

Regarding Claim 8, Schantz et al. teach the method wherein the dispenser unit is rejected based on the evaluated performance characteristic (Column 6, lines 38-40). They do not specifically teach the array is rejected, however, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to reject the array having droplets dispensed by the rejected dispenser unit for the obvious benefit of quality control i.e.

any array fabricated using a rejected dispenser unit would also be rejected because one skilled in the art would expect the array and the reactions performed using the array to be of low quality and therefore, the skilled practitioner would reject the array based on its expected low quality.

Regarding Claim 9, Schantz et al. teach the method wherein the dispenser unit comprise a pulse jet which ejects a droplet in response to a signal (i.e. voltage) and the error is corrected by re-priming the pulse jet (i.e. adjusts the voltage which primes the pulse (Column 7, lines 1-17).

Regarding Claim 10, Schantz et al. teach the method comprising when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance and correlating the error with dispenser unit which is rejected based on the error (Column 6, lines 38-40) but they do not specifically teach the one or more features on the array are rejected. However, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to reject the array having droplets dispensed by the rejected dispenser unit for the obvious benefit of quality control i.e. any droplet dispensed using a rejected dispenser unit would also be rejected because one skilled in the art would expect the droplet and the reactions performed using the droplet to be of low quality and therefore, the skilled practitioner would reject the droplet based on its expected low quality.

Regarding Claim 11, Schantz et al. teach the method additionally comprising saving information relating to the defective features onto a storage medium i.e. printer processor (Column 6, lines 7-27).

Regarding Claim 12, Schantz et al. teach the method wherein the tolerance is 0 (i.e. go/no-go decision, Column 6, lines 38-39).

Regarding Claim 13, Schantz et al. teach the method wherein the dispenser unit comprises pulse jets which eject a droplet in response to a priming signal (Column 3, lines 13-

21) and the evaluated performance characteristic is whether one or more pulse jest are primed (Column 6, lines 23-37).

Regarding Claim 14, Schantz et al. teach the method additionally comprising, when an error is detected, then firing the jet until the signals indicate the jet is primed (Column 6, lines 38-49). Schantz et al. teach the additional steps of adjusting the printing algorithm if the jet does not fire. However, the open claim language "comprising" encompasses the additional steps of Schantz et al.

Regarding Claim 17, Schantz et al. teach the method wherein the sensor comprises the substrate i.e. the surface upon which the droplets are dispensed (Column 7,lines 26-30).

Regarding Claim 18, Schantz et al. teach the method wherein the evaluated performance characteristic is the size (i.e. volume) of droplets dispensed (Column 4, lines 9-11).

Regarding Claim 19, Schantz et al. teach the method wherein the evaluated performance characteristic is the velocity of droplets dispensed (Column 4, lines 11-12).

Regarding Claim 20, Schantz et al. teach the method wherein droplet velocity is evaluated based on the difference in time between when the dispenser unit is activated and the time when the signal is detected (Column 4, lines 22-29).

Regarding Claim 28, Schantz et al. teach an apparatus comprising: a drop dispensing unit which can deposit droplets onto different addresses on a substrate; a sensing element and an amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 7-42); and a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the dispensing unit; and when an error is detected, operates the apparatus to correct for the error or compensate for the error (Column 6, lines 23-64) but they do not teach the droplets carry biopolymers or biopolymer precursors, however, dispensed droplets carrying biopolymers and biopolymer precursors were well known in the art at the time the claimed invention was made as taught by Brennen who teach a similar apparatus comprising a drop dispensing unit

which can deposit droplets carrying biopolymers and/or biopolymer precursors onto a substrate (Column 7, lines 8-15) wherein the substrate comprising the droplets provides the means for performing a large number of reactions on the substrate. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets dispensed in by the apparatus of Schantz et al. (a) with the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions.

Regarding Claim 29, Schantz et al. teach the apparatus wherein the processor causes the drop dispensing unit to dispense droplets toward the sensing element; and when the error is detected the processor operates the apparatus to correct for the error or compensates for the error (Column 6, lines 23-64).

Regarding Claim 31, Schantz et al. teach an apparatus comprising a drop dispensing unit which can deposit droplets onto different addresses on the substrate; a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 7-42); and a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the apparatus; and when an error is detected in which an evaluated performance characteristic is outside a predetermined tolerance correlates the error with one or more features on the array i.e. the program correlates droplet detection values and faulty nozzles (Column 6, lines 23-64) but they do not teach the droplets carry biopolymers or biopolymer precursors. However, dispensed droplets carrying biopolymers and biopolymer precursors were well known in the art at the time the claimed invention was made as taught by Brennen who teach a similar apparatus comprising a drop dispensing unit which can deposit droplets carrying biopolymers and/or biopolymer precursors onto a substrate (Column 7, lines 8-15) wherein the substrate

comprising the droplets provides the means for performing a large number of reactions on the substrate. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions.

Regarding Claim 32, Schantz et al. teach the apparatus additionally comprising saving information relating to the defective features onto a storage medium i.e. printer processor (Column 6, lines 7-27).

Regarding Claim 33, Schantz et al. teach the method of Claim 10 wherein the tolerance is 0 (i.e. go/no-go decision, Column 6, lines 38-39).

Regarding Claim 34, Schantz et al. teach an apparatus comprising: a substrate holder onto which a substrate may be mounted (Column 7, lines 25-45); a drop dispensing unit which can deposit droplets onto different addresses on the substrate; a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 7-42); and a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the apparatus (Column 6, lines 23-64) but they do not teach the droplets carry biopolymers or biopolymer precursors, however, dispensed droplets carrying biopolymers and biopolymer precursors were well known in the art at the time the claimed invention was made as taught by Brennen who teach a similar apparatus comprising a drop dispensing unit which can deposit droplets carrying biopolymers and/or biopolymer precursors onto a substrate (Column 7, lines 8-15) wherein the substrate comprising the droplets provides the means for performing a large number of reactions on the substrate. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with

the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions. Regarding Claim 35, Schantz et al. teach an apparatus comprising: a drop dispensing unit which can deposit droplets onto different addresses on the substrate; a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 7-42) wherein the sensing element comprises a substrate holder such that the dispensed droplets generate the electrical signals which are conveyed through at least part of the holder (Column 7, lines 31-37); and a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the apparatus (Column 6, lines 23-64) but they do not teach the droplets carry biopolymers or biopolymer precursors, however, dispensed droplets carrying biopolymers and biopolymer precursors were well known in the art at the time the claimed invention was made as taught by Brennen who teach a similar apparatus comprising a drop dispensing unit which can deposit droplets carrying biopolymers and/or biopolymer precursors onto a substrate (Column 7, lines 8-15) wherein the substrate comprising the droplets provides the means for performing a large number of reactions on the substrate. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions.

Regarding Claim 36, Schantz et al. teach an apparatus comprising: a drop dispensing unit which can deposit droplets onto different addresses on the substrate; a sensing element

and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 7-42); and a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the apparatus (Column 6, lines 23-64) but they do not teach the droplets carry biopolymers or biopolymer precursors, however, dispensed droplets carrying biopolymers and biopolymer precursors were well known in the art at the time the claimed invention was made as taught by Brennen who teach a similar apparatus comprising a drop dispensing unit which can deposit droplets carrying biopolymers and/or biopolymer precursors onto a substrate (Column 7, lines 8-15) wherein the substrate comprising the droplets provides the means for performing a large number of reactions on the substrate. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions.

Regarding Claim 37, Schantz et al. teach the apparatus wherein the processor evaluates droplet velocity based on the time difference between when the dispenser unit was activated and when the signal was detected (Column 4, lines 22-29).

Regarding Claim 43, Schantz et al. teach a computer program product comprising a computer readable storage medium, the program performing the steps of: dispensing droplets; detecting electrical signals form the droplets; evaluating a performance characteristic of the apparatus; and when an error is detected, correct or compensate for the error i.e. the printer processor, printing code and signal processing code (Column 6, lines 23-49 and Fig. 1).

Regarding Claim 44, Schantz et al. teach a computer program product comprising a computer readable storage medium, the program performing the steps of: dispensing droplets onto a substrate and a sensor element; detecting electrical signals form the droplets; evaluating

a performance characteristic of the apparatus; and when an error is detected, correct or compensate for the error i.e. the printer processor, printing code and signal processing code (Column 6, lines 23-49 and Fig. 1).

5. Claims 6, 15, 16, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz et al. (U.S. Patent No. 6,086,190, filed 7 October 1997) and Brennen (U.S. Patent No. 5,474,794, filed 27 May 1993) as applied to Claim 1 above and further in view of Brown et al. (U.S. Patent No. 5,807,522, filed 7 June 1995).

Regarding Claim 6, Schantz et al. teach a method of fabricating at least one addressable array on a substrate comprising: dispensing droplets from a drop dispenser unit onto the sensing element on the substrate; detecting electrical signals from the dispensed droplets striking the sensor element; and evaluating a performance characteristic of the deposition based on the detected signals (Column 2, line 59-Column 3, line 21 and Column 4, lines 4-12). Schantz et al. do not teach the droplets carry biopolymers. However, Brennan teaches a similar method of fabricating an array comprising: dispensing droplets carrying biopolymers onto a substrate; and detecting signals resulting from the deposit of the biopolymers (Column 2, line 50-Column 3, line 36). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer carrying droplets taught by Brennan to thereby provide an addressable array of biopolymers for the expected benefit conducting a large number of biopolymer reactions each at a specific address on a support as taught by Brennan (Column 2, lines 11-15). Additionally, Schantz et al. teach the method wherein an error is detected after dispensing droplets and the source of the error is corrected or the apparatus is operated to compensate for the error (Column 6, line 38-Column 7, line 17) but they do not teach multiple arrays are fabricated on the same substrate. However, Brown et al. teach a similar method comprising for each of multiple addresses, dispensing droplets comprising biopolymers onto a substrate wherein

multiple array are fabricated on the same substrate (Column 11, lines 43-61). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the array of Schantz et al. and Brennen with the multiple array fabrication of Brown et al. to thereby fabricate identical substrates for performing mass screenings with minimal handling for the expected benefit of rapid and convenient screening as taught by Brown et al. (Column 15, lines 59-67).

Regarding Claim 15, Schantz et al. teach the method wherein the sensing element is stuck by droplets to generate electrical signals (Column 3, lines 23-30) but they do not teach the dispenser unit is repeatedly scanned across the substrate while dispensing droplets. However, Brown et al. teach the similar method wherein the dispenser unit is repeatedly scanned across the substrate (Column 7, lines 17-34). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the dispenser of Schantz et al. and Brennen with the dispenser which scans across the substrate as taught by Brown et al. to thereby dispense repeatedly and accurately the biopolymer droplets for the expected benefit of providing a substrate capable of rapid and convenient screening as taught by Brown et al. (Column 15, lines 59-67).

Regarding Claim 16, Schantz et al. teach the method wherein the sensing element is struck by droplets so as to generate electrical signals ((Column 3, lines 23-30). AS stated above, it is unclear how the "when the dispenser unit passes.....of the array" further limits the claim.

Regarding Claim 30, Schantz et al. teach the method of Claim 1 wherein the processor cause the drop dispensing unit to dispense droplets; and when the error is detected the processor corrects for or compensates for the error (Column 6, lines 22-49) but the do not teach the method wherein the multiple arrays are formed on the same substrate. However, Brown et al. teach a similar method comprising for each of multiple addresses, dispensing droplets comprising biopolymers onto a substrate wherein multiple array are fabricated on the

same substrate (Column 11, lines 43-61). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the array of Schantz et al. and Brennen with the multiple array fabrication of Brown et al. to thereby fabricate identical substrates for performing mass screenings with minimal handling for the expected benefit of rapid and convenient screening as taught by Brown et al. (Column 15, lines 59-67).

6. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz et al. (a)(U.S. Patent No. 6,086,190, filed 7 October 1997) in view of Schantz et al. (b)(U.S. Patent No. 5,442,384, filed 19 October 1993) and Brennan (U.S. Patent No. 5,474,796, filed 27 may 1993).

Regarding Claim 26, Schantz et al. (a) teach a drop deposition apparatus comprising: a drop dispensing unit (i.e. print head) having multiple dispensers (i.e. nozzles) each of which can deposit droplets onto different addresses onto a substrate; and a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 23-45). While Schantz et al. (a) teach the unit comprises multiple dispensers, they do not specifically teach their drop dispensing unit comprises at least six dispensers. However, Schantz et al. (b) teach a similar apparatus comprising a drop dispensing unit (i.e. print head) having multiple dispensers (i.e. nozzles) wherein their dispensing unit specifically has at least six dispensers and at least six reservoirs such that the dispensing unit can be simultaneously loaded with and dispensed between loadings at least six different droplets (Column 7, lines 10-67 and Fig. 11). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the at least six dispensers and reservoirs taught by Schantz et al. (b) to the similar dispensing unit of Schantz et al. (a) to thereby dispense at least six droplets from respective reservoirs for the expected benefit of

uniform and aligned dispensing of six or more droplets simultaneously as taught by Schantz et al. (b) (Column 3, lines 29-35). Schantz et al.(a) do not teach the droplets carry biopolymers or biopolymer precursors, however, dispensed droplets carrying l (Column 7, lines 8-15). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. (a) with the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense at least six droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (a)(Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions.

Regarding Claim 27, Schantz et al. (a) teach the apparatus wherein the sensing element and amplifier detect electrical signals resulting from the droplets imparting an electrical stimulus to the sensing element (Column 3, lines 23-42).

7. Claims 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz et al. (a)(U.S. Patent No. 6,086,190, filed 7 October 1997) in view of Brennan (U.S. Patent No. 5,474,796, filed 27 may 1993) as applied to Claim 1 above and further in view of Fleischer et al. (U.S. Patent No. 4,067,019, filed 14 June 1976).

Regarding Claims 21-24, Schantz et al. teach a method of fabricating at least one addressable array on a substrate comprising: dispensing droplets from a drop dispenser unit onto the sensing element on the substrate; detecting electrical signals from the dispensed droplets striking the sensor element; and evaluating a performance characteristic of the deposition based on the detected signals (Column 2, line 59-Column 3, line 21 and Column 4, lines 4-12). Schantz et al. do not teach the droplets carry biopolymers. However, Brennan teaches a similar method of fabricating an array comprising: dispensing droplets carrying

biopolymers onto a substrate; and detecting signals resulting from the deposit of the biopolymers (Column 2, line 50-Column 3, line 36). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer carrying droplets taught by Brennan to thereby provide an addressable array of biopolymers for the expected benefit conducting a large number of biopolymer reactions each at a specific address on a support as taught by Brennan (Column 2, lines 11-15). Additionally, Schantz et al. teach the method wherein an error is detected to minimize the cost and increase the accuracy of dispensing (Column 2, lines 21-35) and they teach the sensing element has an insensitive region such that a signal is not generated when a droplet is co-incident with the insensitive region (i.e. the sensing element is a grid of fine wire which generates a signal when a droplet strikes (Column 7, lines 32-37). Schantz et al. do not teach the method wherein droplets are dispensed at at least two different distances from the sensor (Claim 21); wherein the performance characteristic evaluation comprises the placement of droplets (Claim 22); wherein the placement of droplets is evaluated form the relative positions of the dispenser unit (Claim 23); and wherein the sensing element has an insensitive region, and intermediate sensitive regions and placement of droplets is evaluated from the relative positions of the dispensed droplets (Claim 24). However, Fleischer et al. teach the motivation for evaluating performance characteristics (e.g. positioning and relative positioning) of droplet dispensing i.e. proper dispensing alignment is critical for quality substrate fabrication. Therefore, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to further analyze the performance of the dispenser by dispensing droplets at two or more distances from the sensor (Claim 21) analyze placement of droplets (Claim 22); analyze relative positions of the dispenser unit (Claim 23); and analyze relative positions of the dispensed droplets (Claim 24) to thereby analyze numerous performance characteristics for the obvious benefits of fabricating a substrate of the highest quality.

Regarding Claim 25, Schantz et al. teach the method wherein the insensitive region is an opening in the sensing element (i.e. space between the wire grid, Column 7, lines 32-37).

8. Claims 38-42 rejected under 35 U.S.C. 103(a) as being unpatentable over Schantz et al. (a)(U.S. Patent No. 6,086,190, filed 7 October 1997) in view of Brennan (U.S. Patent No. 5,474,796, filed 27 may 1993) as applied to Claim 36 above and further in view of Fleischer et al. (U.S. Patent No. 4,067,019, filed 14 June 1976).

Regarding Claims 38-40, Schantz et al. teach an apparatus comprising: a drop dispensing unit; a sensing element and amplifier to detect electrical signals resulting from dispensed droplets striking the sensing element (Column 3, lines 7-42); and a processor which causes the drop dispensing unit to dispense droplets toward the sensing element and evaluates a performance characteristic of the apparatus (Column 6, lines 23-64) but they do not teach the droplets carry biopolymers or biopolymer precursors. However, Brennen teaches a similar apparatus comprising a drop dispensing unit which can deposit droplets carrying biopolymers and/or biopolymer precursors onto a substrate (Column 7, lines 8-15) wherein the substrate comprising the droplets provides the means for performing a large number of reactions on the substrate. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the droplets of Schantz et al. with the biopolymer and/or biopolymer precursor droplets of Brennen to thereby dispense droplets of biopolymers on a substrate to provide the means for performing a large number of reactions for the expected benefit of minimizing the cost of biopolymer deposit as taught by Schantz et al. (Column 2, lines 21-23) to thereby minimizing the cost of the large number of reactions. Schantz et al. teach the apparatus wherein the processor evaluates droplet velocity based on the time difference between when the dispenser unit was activated and when the signal was detected

(Column 4, lines 22-29) but they do not teach the droplets are dispensed at least two different distances from the sensor. Additionally, Schantz et al. teach the apparatus wherein an error is detected to minimize the cost and increase the accuracy of dispensing (Column 2, lines 21-35) and they teach the sensing element has an insensitive region such that a signal is not generated when a droplet is co-incident with the insensitive region (i.e. the sensing element is a grid of fine wire which generates a signal when a droplet strikes (Column 7, lines 32-37). Schantz et al. do not teach the apparatus wherein droplets are dispensed at at least two different distances from the sensor (Claim 38); wherein the placement of droplets is evaluated from the relative positions of the dispenser unit (Claim 39); and wherein the sensing element has an insensitive region, and intermediate sensitive regions and placement of droplets is evaluated from the relative positions of the dispensed droplets (Claim 40). However, Fleischer et al. teach the motivation for evaluating performance characteristics (e.g. positioning and relative positioning) of droplet dispensing i.e. proper dispensing alignment is critical for quality substrate fabrication. Therefore, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to further analyze the performance of the dispenser by dispensing droplets at two or more distances from the sensor (Claim 38); analyze relative positions of the dispenser unit (Claim 39); and analyze relative positions of the dispensed droplets (Claim 40) to thereby analyze numerous performance characteristics for the obvious benefits of fabricating a substrate of the highest quality.

Regarding Claim 41, Schantz et al. teach the apparatus wherein the insensitive region is an opening in the sensing element (i.e. space between the wire grid, Column 7, lines 32-37).

Regarding Claim 42, Schantz et al. teach the apparatus wherein the insensitive region is a gap between sensitive regions in the form of linear conductors (i.e. space between the wire grid, Column 7, lines 32-37).

Response to Arguments

9. Applicant states that Brennan deposits biomonomers while the instant claims are drawn to biopolymers. The comment is noted, however it is also noted that the claims are drawn to deposits of biopolymer or biopolymer precursors. While Brennan clearly teaches deposits of biopolymer precursors (Fig. 6), they also teach biopolymer deposits i.e. the reactions occurring following deposit include antibody/antigen binding and oligonucleotide specific binding (Column 2, lines 22-28)

Applicant argues the combination of Schantz et al and Brennan because the references do not provide the requisite motivation. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Schantz et al teach a method for printing comprising ink drop deposit combined with signal processing and sensing circuitry (Column 2, lines 21-35) wherein their method "minimizes printer and printing costs" (Abstract). Additionally, Brennan teaches a method for depositing biopolymers and biopolymer precursors to thereby provide an addressable array of biopolymers. One skilled in the art would have been motivated to apply the biopolymer and biopolymer precursor deposits of Brennan to the depositing apparatus of Schantz et al based on the motivation provided by Schantz et al i.e. minimizing printer and printing costs (Abstract).

Applicant argues that Schantz et al and Brennan teach away from the combination of their teaching. The argument has been considered but is not found persuasive because Applicant does not point to evidence of teaching away. Without such evidence, the argument is deemed moot.

Applicant argues that the examiner has based the rejection on hindsight reasoning. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant argues that while Schantz et al discusses the advantages of their apparatus (i.e. eliminates clogging problems resulting from paper and dry ink and to optimize drive voltage), they do not provide the adequate motivation to apply their teaching to the Brennan apparatus because Brennan does not use paper or ink and because Brennan's apparatus has less than 5% variability in drop size. The argument has been considered but is deemed moot in view of the fact that it does not address the basis of the rejection. The claims are rejected over Schantz et al in view of Brennen. As stated above, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the biopolymer and biopolymer precursor deposits of Brennan to the depositing apparatus of Schantz et al based on the motivation provided by Schantz et al i.e. minimizing printer and printing costs (Abstract).

Applicant argues that the examiner has not pointed to a motivation or suggestion of the subject matter of the claim invention because the examiner has pointed to a citation suggesting testing at the end of a page and not on the array as claimed. The argument has been considered but is not found persuasive because it does not address the basis of the rejection. Schantz et al in view of Brennan, when considered as a whole, clearly suggests the claimed invention. Schantz et al teach a method of printing on paper and Brennan teaches a similar method of printing on an array. As stated above, It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the biopolymer and biopolymer precursor deposits of Brennan to the depositing apparatus of Schantz et al based on the motivation provided by Schantz et al i.e. minimizing printer and printing costs (Abstract).

Applicant argues that Schantz et al do not teach the claimed re-priming and de-priming. The claims are given the broadest reasonable interpretation consistent with the claim language and specification wherein priming and de-priming are not defined. Priming, is interpreted to encompass preparing or stimulating for printing and de-priming is interpreted to encompass unpreparing or unstimulating. Therefore, the voltage application and adjustment which prepares the printer for printing is encompassed by the claimed priming and unpriming. The courts have stated that claims must be given their broadest reasonable interpretation consistent with the specification *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997); *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969); and *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (see MPEP 2111).

Applicant argues that Shantz et al do not teach when and error is detected...identifying one of more features on the array and rejecting the array; communicating an identity of the

identified defective features; sensor comprises a substrate and substrate holder. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As stated above, Schantz et al teach error detection (Column 6, line 38-40); communication information regarding defective features (Column 6, lines 7-27); a substrate (Fig. 1, #14); and a substrate holder (Fig. 5 # 50, #55 and #53). The claims are given their broadest reasonable interpretation in view of the claim language and specification and given the broadest reasonable interpretation, Shantz et al in view of Brennan, teach the claimed invention.

Applicant argues that the Fig. 11 does not illustrate six reservoirs and dispensers as claimed. The argument is not found persuasive because, as application notes, Fig. 11 illustrates a TAB which is attached to the ink jet cartridge. Therefore, the ink jet comprises the components illustrated in Fig. 11 which illustrates 12 chambers #98. Fig. 10 further illustrates chamber #98 and the adjacent channel through which the drop exits. Therefore, the channels and vaporization chambers illustrated in Fig. 10 and 11 are encompassed by the claimed reservoirs and dispensers.

Applicant repeatedly argues that the examiner has not provided a prima facie case of obviousness because the examiner has not pointed to motivation or suggestion in the references. The arguments have all been considered but are not found persuasive because motivation for each of the rejections has been provided by the examiner within the body of the rejection. Applicant does not address the provided motivations, therefore, the arguments are deemed moot because they do not address the basis of the rejection.

10. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

11. No claim is allowed.

12. The examiner's Art Unit has changed from 1655 to 1634. Please address future correspondence to Art Unit 1634.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (703) 306-5878. The examiner can normally be reached on 6:30 TO 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on (703) 308-1152. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-4242 for regular communications and (703) 308-8724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

BJ Forman, Ph.D.
Patent Examiner
Art Unit: 1634
May 13, 2002

W. Gary Jones
Supervisory Patent Examiner
Technology Center 1600